IN THE CLAIMS:

Please cancel claims 1-48 without prejudice or disclaimer, and substitute new claims 49-96 therefor as follows:

Claims 1-48 (Cancelled).

49. (New) An expandable bladder for tyre manufacturing apparatuses, comprising:

at least one first layer of a first elastomer material, and

a second layer of a second elastomer material different from said first elastomer material;

wherein said second layer is at a position radially external to said first layer;

wherein said first and second layers have an undulated interface profile; and

wherein said interface profile defines mechanical-engagement elements between the first and second elastomer materials.

50. (New) The bladder as claimed in claim 49, having a toroidal conformation.

51. (New) The bladder as claimed in claim 49, having at least one circumferential edge carrying at least one circumferential anchoring tailpiece.

52. (New) The bladder as claimed in claim 49, wherein the interface profile has a wave height and a wave pitch, wherein the wave height is higher than or as high as one tenth of the wave pitch.

53. (New) The bladder as claimed in claim 52, wherein the wave height is higher than half the wave pitch.

54. (New) The bladder as claimed in claim 49, wherein the undulated profile has a plurality of waves with an inclined extension relative to a direction normal to a median extension line of the undulated profile itself.

55. (New) The bladder as claimed in claim 54, wherein each wave has an inclination angle between a bisecting line of a vertex of said wave and said direction normal to the median line of about 45° and about 88°.

56. (New) The bladder as claimed in claim 55, wherein said inclination angle is about 60° to about 85°.

57. (New) The bladder as claimed in claim 49, wherein said mechanical-engagement elements have portions of mutual undercut constraint.

58. (New) The bladder as claimed in claim 49, wherein a third layer of elastomer material cross-linked with at least said first elastomer material is disposed at a position radially internal to said first layer.

59. (New) The bladder as claimed in claim 49, wherein a fourth layer of elastomer material cross-linked with at least one of said first and second elastomer materials is disposed at a position radially external to said second layer.

60. (New) The bladder as claimed in claim 49, wherein said second layer extends along at least one surface portion of the first layer.

61. (New) The bladder as claimed in claim 60, wherein said at least one surface portion of the first layer is close to a circumferential edge of the bladder.

62. (New) A method of manufacturing an expandable bladder for tyre manufacturing apparatuses, comprising the steps of:

preparing at least one first elongated element including a first raw elastomer material and at least one second elongated element including a second raw elastomer material having a different composition from that of the first elastomer material;

laying said first elongated element on a forming support in the form of coils wound up around a geometric axis of said forming support so as to form a first layer of said first elastomer material;

laying said second elongated element on the forming support in the form of coils wound up around the geometric axis of said forming support so as to form a second layer of said second elastomer material at a radially external position to said first layer;

said first and second layers having an undulated interface profile, wherein said interface profile defines mechanical-engagement elements between the first and second elastomer materials; and

curing said bladder.

63. (New) The method as claimed in claim 62, wherein said interface profile has a wave height and a wave pitch in which the wave height is at least as high as one tenth of the wave pitch.

64. (New) The method as claimed in claim 63, wherein the wave height is higher than half the wave pitch.

65. (New) The method as claimed in claim 63, wherein the undulated profile has a plurality of waves with an inclined extension relative to a direction normal to a median extension line of the undulated profile itself.

66. (New) The method as claimed in claim 65, wherein each wave has an inclination angle between a bisecting line of a vertex of said wave and a direction normal to the median line of about 45° to about 88°.

67. (New) The method as claimed in claim 66, wherein said inclination angle is about 60° to about 85°.

68. (New) The method as claimed in claim 62, wherein said mechanical-engagement elements have portions of mutual undercut constraint.

69. (New) The method as claimed in claim 62, wherein at least one of said first and second elongated elements has a flattened cross-section conformation.

70. (New) The method as claimed in claim 62, wherein at least one of said first and second elongated elements has a substantially triangular cross-section conformation.

71. (New) The method as claimed in claim 62, wherein at least one of said first and second elongated elements has a substantially trapezoidal cross-section conformation.

72. (New) The method as claimed in claim 62, further comprising a step of mutually coupling the first and second elongated elements in the longitudinal extension of same for preparing a continuous strip-like element that is wound around the geometric axis of said forming support during the laying step.

73. (New) The method as claimed in claim 72, wherein the coupling step is carried out before the laying steps.

74. (New) The method as claimed in claim 72, wherein preparation of the continuous strip-like element comprises the steps of:

feeding the first elongated element through a first feeding member;

feeding the second elongated element through a second feeding member simultaneously with feeding of the first elongated element; and

guiding the first and second elongated elements in converging direction with respect to each other toward a point of mutual coupling.

75. (New) The method as claimed in claim 74, wherein feeding of the first and second elongated elements takes place by extrusion through a first and a second extruders respectively, which are part of said first and second feeding members.

76. (New) The method as claimed in claim 72, wherein the continuous strip-like element is made by co-extrusion of the first and second elongated elements through the same extruder.

77. (New) The method as claimed in claim 72, wherein the coupling step is carried out simultaneously with winding of the strip-like element on the forming support at a point of mutual coupling between the elongated elements located on the forming support.

78. (New) The method as claimed in claim 72, wherein the coupling step is carried out simultaneously with winding of the strip-like element on the forming support at a point of mutual coupling between the elongated elements located upstream of the forming support.

79. (New) The method as claimed in claim 62, wherein the first and second elongated elements are simultaneously laid on the forming support at points mutually spaced apart in a circumferential direction.

80. (New) The method as claimed in claim 72, wherein following the coupling step, each of said elongated elements has a base portion integral with a base portion of the other elongated element, and at least one of said elongated elements has an apex transversely projecting from the base portion with respect to a mutual-alignment direction of the base portions.

81. (New) The method as claimed in claim 80, wherein the first and second elongated elements are coupled at mutually offset positions transversely of a direction of mutual alignment of the base portions, so that each elongated element has said apex projecting in the opposite direction with respect to the apex of the other elongated element.

82. (New) The method as claimed in claim 80, wherein the apex of an elongated element is turned up against a base portion of the other elongated element.

83. (New) The method as claimed in claim 62, wherein laying of each of said first and second elongated elements comprises the steps of:

feeding the elongated element from a feeding member disposed close to the forming support to apply said elongated element onto the support itself;

giving the forming support a rotatory motion for circumferential distribution around the geometric rotation axis so that the elongated element is circumferentially distributed on the forming support; and

carrying out controlled relative transverse-distribution displacements between the forming support and the feeding member to form said coils.

84. (New) The method as claimed in claim 62, further comprising the step of applying at least one third layer radially internal to said first layer onto the forming

support, which third layer is of an elastomer material cross-linkable with said first elastomer material.

85. (New) The method as claimed in claim 62, further comprising the step of applying a fourth layer to said second layer at a radially external position, said fourth layer being of an elastomer material cross-linkable with at least said second elastomer material.

86. (New) The method as claimed in claim 62, wherein during the bladder-curing step at least one step of injecting elastomer material into said mould is carried out to form at least one additional coating layer on the bladder.

87. (New) A process for manufacturing tyres comprising the steps of:

forming on a drum, a carcass structure comprising at least one carcass ply having opposite end flaps in engagement with respective annular reinforcing structures;

inflating at least one expandable bladder in the vicinity of each of said annular reinforcing structures;

shaping the carcass structure into a toroidal conformation to apply an annular belt structure and a tread band to the carcass ply; and

curing the tyre;

wherein each of said expandable bladders comprises:

at least one first layer of a first elastomer material and one second layer of a second elastomer material different from said first elastomer material;

wherein said second layer is at a radially external position to said first layer;

wherein said first and second layers have an undulated interface profile; and

wherein said interface profile defines mechanical-engagement elements between the first and second elastomer materials.

88. (New) The process for manufacturing tyres as claimed in claim 87, wherein associated with the carcass structure are sidewalls extending each away from one of the annular reinforcing structures, wherein the step of inflating said expandable bladders is at least partly carried out after the shaping step for applying each sidewall against the carcass ply.

89. (New) The process as claimed in claim 87, comprising the step of:

inflating at least one expandable bladder in the vicinity of each of the axially opposite edges of said annular belt structure to apply them against the carcass ply.

90. (New) The process of manufacturing tyres as claimed in claim 87, wherein each of said expandable bladders has a toroidal conformation.

91. (New) A manufacturing apparatus for tyres of vehicle wheels, comprising:

devices designed to form a carcass structure on a drum, which carcass structure comprises at least one carcass ply having opposite end flaps in engagement with respective annular reinforcing structures;

at least one pair of expandable bladders operatively associated with said drum, each of said expandable bladders being inflatable in the vicinity of one of said annular reinforcing structures;

devices for positioning a belt structure around said carcass structure; and

devices to shape the carcass structure into a toroidal conformation for applying an annular belt structure to the carcass ply;

wherein each of said expandable bladders comprises:

at least one first layer of a first elastomer material and one second layer of a second elastomer material different from said first elastomer material;

wherein said second layer is at a position radially external to said first layer;

wherein said first and second layers have an undulated interface profile; and

wherein said interface profile defines mechanical-engagement elements between the first and second elastomer materials.

92. (New) The apparatus as claimed in claim 91, wherein said devices designed to form the carcass structure comprise members for applying a pair of sidewalls extending each on one of said expandable bladders in a deflated condition, so that said sidewalls are applied against the carcass ply following inflation of said expandable bladders.

93. (New) The apparatus as claimed in claim 91, comprising:

at least one pair of expandable bladders operatively associated with said positioning devices of the belt structure, each of said expandable bladders being inflatable in the vicinity of one of the axially opposite edges of the belt structure to cause application of the latter against the carcass ply shaped into a toroidal conformation.

94. (New) The apparatus as claimed in claim 91, wherein said drum is a building drum.

95. (New) The apparatus as claimed in claim 91, wherein said drum is a shaping drum.

96. (New) The manufacturing apparatus for tyres of vehicle wheels as claimed in claim 91, wherein said expandable bladder comprises:

at least one first layer of a first elastomer material, and

a second layer of a second elastomer material different from said first elastomer material;

wherein said second layer is at a position radially external to said first layer;

wherein said first and second layers have an undulated interface profile;

wherein said interface profile defines mechanical-engagement elements between the first and second elastomer materials; and

wherein said bladder has a toroidal conformation.